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tunnel; and they propose to make a secondary tunnel, cutting an angle of the S in the natural tunnel.

There are enormous quantities of marketable timber throughout this whole section; cherry, walnut, oak, chestnut, poplar, hickory, etc., growing everywhere. In the extreme south-west of Virginia, fine large poplars are found in great abundance. In Shady Valley, Tenn., is an extensive forest of several thousand acres, in which are to be found most magnificent pines, straight as an arrow, and many over a hundred and fifty feet high.

The mineral wealth of the country has just begun to receive proper attention. Within the past few years the well-known Cranberry iron-mines have been opened, the ore from which is of very fine quality;

and it is claimed that the same body can be traced, almost continuously, far north into Virginia. There are several copper-mines in the north-western part of North Carolina which await only the influx of capital to produce in large quantities. Gold has also been found in this section in small amount.

Throughout that part of south-western Virginia lying north-west of Clinch Mountains, coal is found in almost every ridge, and, at Pocahontas, is mined in large quantities. Copper and iron have also been found scattered throughout this section. This region needs only railroad facilities to become one of the richest districts in the east. It can supply coal and timber in enormous quantities; and, from all accounts, iron and copper mining would also be profitable.

### RECENT PROCEEDINGS OF SCIENTIFIC SOCIETIES.

Franklin institute, Philadelphia.

Feb. 20. — Mr. S. Lloyd Wiegand presented a further communication respecting the use of cast-iron in the construction of steam-boilers; illustrating his remarks by bursting, under hydrostatic pressure, a model of the exploded Gaffney boiler, which had been the cause of a protracted legal controversy in Philadelphia. Mr. Wiegand protested against the sweeping condemnation of cast-iron as a material for steam-boiler heads, and especially deprecated the effort that had been made to commit the institute as a scientific body, to suit an expression of opinion without experimental verification. On Mr. Washington Jones's motion, a resolution was adopted, in which the national Congress is urged to appoint a commission of experts for the testing of iron, steel, and other materials used for structural purposes, and to make a suitable appropriation for the work of the commission. — Mr. David Cooper exhibited a remarkably fine suite of specimens of direct life-size camera portraits, admirably illustrating the progress which has lately been made in dry-plate photography. These pictures were taken with dry plates prepared by the Eastwick dry-plate company of New York.

Canadian institute, Toronto.

Feb. 16. — Prof. J. Playfair McMurich read a paper on the osteology of *Amiurus catus*, one of a series on the morphology and development of that fish. The paper treated particularly of the high specialization of *Amiurus*, as instanced by the small amount of cartilage in the skull, and by the great modification of the maxillae and of the pectoral and dorsal fins.

Princeton science club.

Feb. 14. — Professor George Macloskie reported his researches on the tracheal organs of insects, by which it appears that their spiral filaments are not independent structures, but crenulations or inward foldings, with thickening of the chitinous wall; that the spirals are really tubular, fissured at the line of infolding, and continuous with the enclosing wall. The

function of aeration is discharged by air passing, not through the wall into the blood, but directly to the tissues by lung-like terminal cells, long ago described by Louis Agassiz, and shown by Max Schultze to be especially abundant near the luminous organs of the glow-worm.

Prof. H. F. Osborn reported, that in the opossum, unlike the kangaroos, the superior and inferior mesenteric arteries and coeliac axis arise from a common trunk above the renal arteries, — a reduction similar to that found in the monotremes.

Prof. W. B. Scott stated that the hind-foot of the American miocene *Enteledon* shows, like the European, the third and fourth metatarsals greatly enlarged, the second and eighth very rudimentary. The third is borne entirely by the external cuneiform; the middle cuneiform is very small, and coalesced with the external cuneiform; and the internal is very narrow, and articulates above with the navicular, and below with a hook-like process of the third metatarsal. The rudimentary second metatarsal is wedged in between the middle and internal cuneiforms. This type of foot corresponds to Kovalevsky's 'inadaptive type of reduction,' nearly half of the bearing-surface of the tarsus being unemployed.

Dr. McCay called the attention of the club to a letter in the last number of the *Jahrbuch für Mineralogie*, from Professor Sandberger of Würzburg. In a pamphlet which appeared recently in Germany, McCay had attacked Sandberger respecting his alleged discovery of the rhombic modification of speiskobalt. McCay has proven that the honor of the discovery is due to Breithaupt of Freiberg; and Sandberger, convinced by the ample evidence, has in his letter admitted the correctness of the arguments advanced, and signified his readiness to withdraw his name 'spathiopyrite,' and to substitute in its place the Breithaupt term, 'safflorite.' Dr. McCay further reported upon eight analyses of argillaceous limestones, several of which seemed admirably fitted for making hydraulic cement.

Prof. C. G. Rockwood and Mr. Fine gave synthetic

demonstrations of the formula for the prismatoid, one section being made at will. — Mr. Smith gave a new and simple demonstration of the ellipse of stress. — Mr. Magie gave a proof for the movement of liquids in capillary tubes, both cylindrical and conical. — Mr. M. McNeill gave a method for reducing to the mean time of observation a series of micrometer measures of distance and position angle, when one of the objects has such a large proper motion that these quantities do not vary proportionally with the time.

Society of arts, Massachusetts institute of technology.

Jan. 24. — Capt. D. A. Lyle, U.S.A., read a paper on the rise, progress, and methods of the U. S. life-saving service. The first organized attempt at saving life imperilled by wreckage was inaugurated by the Massachusetts humane society in 1782, but the true inception of the U. S. service was in 1848; and since that time, in spite of reverses, inadequate appropriations, etc., the service has steadily advanced in efficiency. It was established on its present enlarged basis in 1878, after several years of struggle. At present the whole number of stations is 189, of which 139 are on the Atlantic coast. The following statistics for the year ending June 30, 1882, will show the efficiency of the service: disasters, 345; property involved, \$4,766,000; property saved, \$3,106,000; persons involved, 2,398, of whom all but 12 were saved; total expense, \$594,889.74, or at the rate of less than \$250 per person, without considering the value of property saved. During the more inclement months, dangerous shores are constantly patrolled; and upon discovering a wreck, a projectile is fired over the vessel, carrying a line, by means of which the sailors draw out a cable, which they secure to the mast, and on which a life-car or a breeches-buoy is run back and forth, by which those on board are carried to the shore. Capt. Lyle explained all the details of the methods used, by means of a model. — Mr. N. M. Lowe exhibited a model showing a method of transmitting power by belting, designed to replace the ordinary fast and loose pulley.

Academy of natural sciences, Philadelphia.

Jan. 15. — Prof. H. C. Lewis exhibited a specimen of limestone from Utah which emitted a lurid red light when struck, scratched, or heated. The glow lasted from half a second, when lightly struck, to a much longer time as the result of a blow. On examination, the specimen proved to be an almost perfectly pure carbonate of lime, with but a slight percentage of impurities. It is loose-grained, white, and crystalline, the grains being but slightly coherent, thus giving the rock the appearance of a soft sandstone. It crumbles easily between the fingers, forming a coarse sand. When heated in a glass tube over a flame, it glows with a deep red light, which lasts for a minute or more after withdrawing the flame. After two or three heatings the phosphorescent property disappears. A search through the collection of the academy for limestones having similar properties resulted in finding specimens from Kaghberry, India, which glowed with a strong yellow phosphorescence

when heated, although no such effect was produced by scratching or striking. It was of great interest to find that the Indian limestone alone, of all in the collection, had the precise external characters of that from Utah. This similarity is more than a coincidence. It confirms Becquerel's view that phosphorescence depends upon physical rather than chemical conditions. In the rocks referred to, it is probably dependent upon a disturbance of their loosely aggregated crystalline particles, whether such be produced by percussion, friction, heat, or decrepitation.

Dr. J. Leidy communicated the results of a recent trip made to Atlantic City for the purpose of collecting and studying some of the life-forms thrown up on the beach by the storm of Jan. 8. The shore at the highest line reached by the tide was for miles covered with millions of bushels of the common beach-clam, *Macra solidissima*. In many places they were closely packed together in extensive patches. Besides those visible, it is probable that at least as many more were covered by the sand thrown up at the same time, or had buried themselves in the beach. Until this evidence of the storm he had no suspicion that the mollusk was so exceedingly abundant on the coast; though he had been well aware that it was very common, having repeatedly seen large quantities thrown on shore under similar circumstances. With the *Macra* were other mollusks, which, although numerous enough, appeared to be few, compared to the former. These were *Fulgur carica*, and *F. canaliculata*, *Natica heros*, *N. duplicata*, and *N. obsoleta*. Hermit crabs were also abundant, — *Eupagurus pollicaris* in the shells of *Natica* and *Fulgur*, and *E. longicarpus* in shells of *Natica*. Spider-crabs were common, and a few half-grown horseshoe-crabs were also observed. Some bunches of the common edible mussels were collected.

It seemed remarkable, on the other hand, that some of the commonest mollusks were conspicuous by their absence; few or no oysters, clams (*Venus mercenaria*), squirt-clams, or horse-mussels, having been seen. Scarcely any traces of annelids were observed, except masses of dead *Serpula*. There were also no echinoderms, except one, *Caudina arenata*, which occurred at some places in considerable numbers. It was believed that this was the first time the animal had been observed on the coast of New Jersey. They usually range from three to four inches in length, but several were found upward of six inches, and over an inch in diameter at the thicker portion of the body. They present but little resemblance to the forms commonly recognized as echinoderms or sea-urchins, looking much like large fleshy worms. Dissection, however, at once reveals their true relationship.

It is an interesting question as to what becomes of the vast quantity of *Macra* and other shells incessantly cast on shore. Storms annually oblige the ocean to contribute, from its inexhaustible stores, multitudes of mollusks and other animals to the sandy beach. By exposure to the influence of the weather, the air, the sun, the rain, frosts, and other destructive influences, the calcareous shells are broken

and decomposed, and in a comparatively few years entirely disappear. Carbonic acid of the rain-water must be a potent agent in their ultimate solution, as it percolates through the sand. While the beach receives its constant supplies of shells, no trace of these is to be found in the sand immediately back of the shore, which in former times received the same incessant contributions. For similar reasons, no doubt, calcareous fossils are comparatively rare in sandstones, though in many cases their impressions are well preserved.

#### NOTES AND NEWS.

LUDWIG LIEBRECHT of Lippstadt, in Westphalia, is endeavoring to obtain subscriptions from all countries to establish a memorial in honor of the late Dr. Hermann Müller, whose biography was briefly given in No. 36 of *Science*. The income is to be applied to the support of his family during the life of his widow, and thereafter to aid students of the natural sciences educated at the public school of Lippstadt.

— Professor John LeConte has contributed a series of physical studies of Lake Tahoe to the recent numbers of the *Overland monthly* (San Francisco), in which he sums up what is known of the lake, and suggests lines of work for studious observers to follow. The greatest depth sounded was sixteen hundred and forty-five feet, and the lowest temperature found was at the bottom, 39°.2 F. Like most deep lakes, this one does not freeze, because the winters are not long or strong enough to reduce its entire volume to a cold below this temperature of maximum density. The transparency and color of the water are discussed at length, and an abstract of the recent Swiss studies of lake-oscillations, or *seiches*, is given; as there is every reason to suppose they must occur in our lakes, although not yet recognized here. According to the most reasonable estimates of mean depth, the duration of the longitudinal *seiche* of Lake Tahoe, calculated by Forel's formula, would be eighteen or nineteen minutes; and of the transverse, about thirteen minutes. The lake-basin is regarded as a 'plication hollow' or trough produced between two adjacent and parallel mountain ranges.

— E. and F. N. Spon announce as in preparation 'A history of electricity and of the electric telegraph,' by J. J. Fahie.

— Messrs. Barry, an old wine and coffee firm of London, have since the middle of the last century kept a scale for the amusement of their customers. The results of the weighings have been regularly entered in books kept for the purpose, together with the ages and any remarks called for by the clothing or other condition of the person weighed. Francis Galton, in his search for statistical information of the progress of man, has examined these records, and published a notice of the results in *Nature* for Jan. 17. The weights of the nobility he especially studied, and they show that the variation in weight of this class during the year has steadily declined in the past hundred years from seven to five pounds. Not only is there

this evidence of a more regular and healthy life, but the age of greatest weight, which, with the generation from 1740 to 1769, was reached at forty-five, being at that age about sixteen pounds more than the weight of the 1800-1829 generation at the same age. While from that age the entire generation declined in weight, the tables show that the English nobility born in the early part of this century continued to increase in weight till at least their seventieth year; at their sixty-second year reaching that of their grandparents of the same age, who had been growing lighter for nearly twenty years, the later generation rising in weight at almost the same rate at which the earlier declined. The men of the last century seemed to grow stout in early manhood, then to fall off, while those of the present increase steadily with their age.

— Prof. G. Seguenza continues his studies of the quaternary formation of Rizzolo. His last contribution is devoted to the Ostracoda, and comprises about thirty-two pages quarto, with an excellent plate. About thirty-five species are mentioned, and more are to follow. Ten species are well figured. These often elegantly ornamented little creatures have an enormous range; some of these Sicilian fossils being common to Norway, New Zealand, and Sicily, either living or fossil. A number of new species are described.

— Late signatures of the Proceedings of the U. S. national museum contain a catalogue of mollusca and echinodermata dredged on the coast of Labrador by the expedition under the direction of Mr. W. A. Stearns in 1882. This list, which is carefully annotated, covers eleven pages, is illustrated by a plate, and is more complete than any thing hitherto published. It is due to Miss Katherine J. Bush of New Haven. This, and another paper by Rosa Smith in the same issue, would seem to indicate, that at last, if somewhat tardily, women are about to claim their share of work and honors by serious zoological investigations.

— Herr R. J. Runeberg, who has been examining the Angara River between Yeniseisk and Irkutsk at the request of Sibiriakoff, has returned to St. Petersburg. He reports that the rapids which obstruct navigation on the upper part of the Angara may be easily removed so as to admit of regular traffic on this important Siberian waterway.

— In a lecture by the Russian academician, Fr. Schmidt, on the Vega voyage, the author sees strong reasons for doubting the sanguine view of Norden-skiöld, that commerce may generally or even frequently find a waterway along the coasts of the Siberian Sea. He recalls, among other evidence, the experience of Rakhmanin, who wintered twice at Spitzbergen, and not less than twenty-six times in Novaia Zemlaia, and who found the way to the Yenisei open on only five occasions.

— A society of natural history has been organized at Sedalia, Mo.; and an address by F. A. Sampson, indicating the objects specially in view, was printed in the *Sedalia Daily democrat* of Feb. 13.